

# STORM SURGES, DISASTER PLANNING, AND VULNERABLE POPULATIONS AT THE URBAN PERIPHERY: IMAGINING A RESILIENT NEW YORK AFTER SUPERSTORM SANDY

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## TABLE OF CONTENTS

I. INTRODUCTION .....	19
II. SUPERSTORM SANDY'S IMPACT IN NEW YORK CITY .....	22
A. The Toll.....	22
B. Immediate Response.....	24
C. Interim Steps to Recovery .....	27
1. Application for Community Development Block Grant Funds .....	27
2. The City's After Action Report .....	28
3. The Special Initiative on Rebuilding and Resiliency .....	29
III. RESILIENCE AS A DISCOURSE.....	30
A. Deconstructing Resilience .....	30
B. The City's Discourse of Resilience .....	33
IV. A SPECTRUM OF RESILIENCE STRATEGIES: WHAT THE CITY CAN DO .....	35
V. THE SOCIAL DIMENSIONS OF WEATHER DISASTER: WHAT THE CITY SHOULD DO.....	41
VI. CONCLUSION .....	46

## I. INTRODUCTION

In the aftermath of Sandy, the destructive superstorm that had a devastating impact in New York City and other parts of the Northeastern U.S. in 2012, ideas and data proliferate about how coastal cities, such as New York, can pursue strategies of resilience to help withstand the next weather-related onslaught.<sup>1</sup> These ideas include the reality that the city's response must take account of the vulnerable populations at its periphery.<sup>2</sup> Superstorm Sandy put a face to their vulnerability, including 6,800 evacuees assigned to shelters, 1,800 of whom were residents of chronic care facilities located in flood zones.<sup>3</sup> The vulnerable

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1. See LINDA I. GIBBS & CASWELL F. HOLLOWAY, NYC HURRICANE SANDY AFTER ACTION: REPORT AND RECOMMENDATIONS TO MAYOR MICHAEL R. BLOOMBERG 1 (2013) [hereinafter NYC HURRICANE SANDY AFTER ACTION REPORT], available at [http://www.nyc.gov/html/recovery/downloads/pdf/sandy\\_aar\\_5.2.13.pdf](http://www.nyc.gov/html/recovery/downloads/pdf/sandy_aar_5.2.13.pdf).

2. *Id.* at 27.

3. *Id.* at 17–18.

also included countless numbers of elderly and disabled people, and non-English speakers, who were stranded in New York City Housing Authority-owned buildings without electricity, heat, and hot water for weeks as a consequence of storm surges that flooded basement-level heating and electrical systems.<sup>4</sup> Crucially, forty-five percent of the Housing Authority's buildings are located in evacuation zones near the waterfront;<sup>5</sup> the siting of these buildings, and particularly their high-rise, tower-in-the-park design, reflect key features of mid-century housing policies informed by slum clearance goals, a post-World War II housing shortage, and considerations of cost.<sup>6</sup>

In its June 2013 report, *A Stronger, More Resilient New York*, the city embraced a comprehensive set of proposals reflecting two principal strategies to achieve resilience in the event of another serious storm: protection, including hard and soft armoring of the coastline, buildings, and key infrastructure; and accommodation, including the use of the city's zoning and building regulatory authority to improve resilience when sea levels rise.<sup>7</sup> At the same time, however, the city has continued to champion waterfront development,<sup>8</sup> a commitment the city's report confirmed.<sup>9</sup> In pledging to rebuild damaged or destroyed structures and infrastructure, the city disavowed reliance on another recognized approach to preparing for weather disasters: managed retreat from coastal areas that are particularly vulnerable to flooding and other storm-related damage.<sup>10</sup> In a section of the report's introduction entitled "What Resiliency Means," the city asserted that it "cannot, and will not, retreat."<sup>11</sup> The report's first unnumbered page also offers a pithy definition of resilience: "able to bounce back after change or adversity" and "capable of preparing for, responding to, and recovering from difficult conditions," followed by "Syn.: Tough[.] See also: New York City."<sup>12</sup>

Although the report's civic boosterism is forgivable, this article argues that whether the city in fact acts resiliently also must take into account the extent to which its proposals respond to the needs of vul-

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4. Eric Lipton & Michael Moss, *Housing Agency's Flaws Revealed by Storm*, N.Y. TIMES, Dec. 9, 2012, <http://www.nytimes.com/2012/12/10/nyregion/new-york-city-housing-agency-was-overwhelmed-after-storm.html?ref=nyregion>.

5. *Id.* at 2.

6. Jonathan Mahler, *How the Coastline Became a Place to Put the Poor*, N.Y. TIMES, Dec. 3, 2012, [http://www.nytimes.com/2012/12/04/nyregion/how-new-york-citys-coastline-became-home-to-the-poor.html?pagewanted=all&\\_r=1&NICHOLAS\\_DAGEN\\_BLOOM\\_PUBLIC\\_HOUSING\\_THAT\\_WORKED\\_59\\_62\\_70-72\\_130-131\\_141](http://www.nytimes.com/2012/12/04/nyregion/how-new-york-citys-coastline-became-home-to-the-poor.html?pagewanted=all&_r=1&NICHOLAS_DAGEN_BLOOM_PUBLIC_HOUSING_THAT_WORKED_59_62_70-72_130-131_141) (2008).

7. CITY OF NEW YORK & MICHAEL R. BLOOMBERG, *A STRONGER, MORE RESILIENT NEW YORK* 47-48 (2013) [hereinafter *A STRONGER, MORE RESILIENT NEW YORK*], available at <http://www.nyc.gov/html/sirr/html/report/report.shtml>.

8. Annie Karni, *Bloomberg Lays Out Post-Sandy Strategy*, CRAIN'S N.Y. BUS. (Dec. 6, 2012, 1:31 PM), [http://www.crainsnewyork.com/article/20121206/REAL\\_ESTATE/121209942](http://www.crainsnewyork.com/article/20121206/REAL_ESTATE/121209942).

9. *A STRONGER, MORE RESILIENT NEW YORK*, *supra* note 7, at 7.

10. *Id.*

11. *Id.*

12. *Id.* at cover page opposite Dedication of Report.

nerable people housed along its coastline, even if these responses entail strategies of managed retreat rather than, or in addition to, adaptive rebuilding.<sup>13</sup> To develop this idea, Part II describes the major categories of Sandy's impact in the city, and the city's immediate responses, including the launch of its Special Initiative on Rebuilding and Resiliency (SIRR). Part III will then consider the city's disjointed rhetoric of resilience, consisting of a popularized usage of the term coupled with a largely unexplained application of a more specialized meaning of resilience as systems responsiveness. This part will deconstruct the city's definition of resilience in relation to recognized conceptions of resilience developed in bio-ecological, international disaster relief, and psychological literatures.

Part IV will examine the city's principal categories of resilience initiatives as reflected in *A Stronger, More Resilient New York*,<sup>14</sup> as well as the report's absence of discussion of managed retreat alternatives. Part V will examine the implications of New York City's identification of resilience with rebuilding and continued waterfront development for its vulnerable (and typically less mobile) populations living in the waterfront areas. Drawing on a richer conception of resilience reflected in the disciplinary approaches discussed in Part III, it offers a conception of resilience emphasizing a city's sovereign obligations grounded in law and social equity to anticipate and monitor the specific and ongoing needs of its more at-risk residents, recognizing the effects of socially-influenced factors such as income and education disparities, race, and gender.

To be sure, a city's strategy of climate resilience should incorporate the following core elements: maintaining back-up capacity in key systems; responding flexibly to evolving conditions; limiting system failure or "domino" effect; ensuring the ability to rebound quickly; and integrating ongoing learning from experience.<sup>15</sup> In considering both an appropriate definition for and potential strategies of resilience in the context of weather-related disasters, the article offers a conception of resilience that takes appropriate account of its social dimensions, and in particular, the needs of vulnerable populations.<sup>16</sup> It argues that focusing attention on human vulnerability illuminates the risks of over-reliance on growth-oriented strategies and the importance of considered use of

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13. *Id.* at 31.

14. *See generally* A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7.

15. NYS 2100 COMMISSION, RECOMMENDATIONS TO IMPROVE THE STRENGTH AND RESILIENCE OF THE EMPIRE STATE'S INFRASTRUCTURE 25 (2013) [hereinafter NYS 2100 COMMISSION], *available at* <http://www.governor.ny.gov/assets/documents/NYS2100.pdf>.

16. *See discussion infra* Parts III, IV, IV.

managed coastal retreat as an alternative or additional strategy in resilience planning.<sup>17</sup>

Given the direct and immediate connection a municipality bears to coastal land, infrastructure, and the people who live and work within its borders, the article argues that resilience for a coastal city entails effective and replicable strategies by which a city government, through public resources and by mobilizing the energies of community networks, prioritizes the wellbeing of its most vulnerable populations.<sup>18</sup> Such reinforcement of the city's "social infrastructure," to borrow sociologist Eric Klinenberg's phrase,<sup>19</sup> should be a key ingredient of New York City's, or any resilient city's, response to the human costs of increasingly predictable weather-related disasters. At minimum, keeping the social dimensions of weather disasters in view should counsel policy makers to remain open to a broader range of resilience strategies beyond a reflexive response to rebuild and "armor" coastal areas and infrastructure.

## II. SUPERSTORM SANDY'S IMPACT IN NEW YORK CITY

### A. The Toll

The municipality of New York is a coastal city with 520 miles of waterfront.<sup>20</sup> Three hundred seventy-five thousand New Yorkers reside in areas identified by the city at the time of the storm's approach as Evacuation Zone A, land at high risk of flooding, and were ordered to evacuate.<sup>21</sup> Among the health-care facilities located in Zone A are "six acute-care hospitals, one psychiatric hospital, twenty-two nursing homes, and eighteen adult care facilities."<sup>22</sup> Although an After Action Report prepared by New York City documents its efforts to encourage Housing Authority residents to comply with a mayoral evacuation order that applied to areas closest to the waterfront, there is mounting evidence that the city and its Housing Authority underestimated the reach of the storm's surges and its impact on high-rise residents.<sup>23</sup> The storm, that struck New York City on the evening of October 29, 2012, reached

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17. *Id.*

18. *Id.*

19. Eric Klinenberg, *Adaptation: How Can Cities be "Climate-Proofed"?*, THE NEW YORKER, Jan. 7, 2013, [http://www.newyorker.com/reporting/2013/01/07/130107fa\\_fact\\_klinenberg](http://www.newyorker.com/reporting/2013/01/07/130107fa_fact_klinenberg) ("social infrastructure: the people, places, and institutions that foster cohesion and support").

20. NYS 2100 COMMISSION, *supra* note 15, at 40; The City of New York, Community Development Block Grant-Disaster Recovery: Partial Action Plan A 3 (2013) [hereinafter Partial Action Plan A], *available at* [http://www.nyc.gov/html/cdbg/downloads/pdf/cdbg-dr\\_full.pdf](http://www.nyc.gov/html/cdbg/downloads/pdf/cdbg-dr_full.pdf).

21. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 8.

22. *Id.*

23. *E.g., id.* (demonstrating how many high-rise residents actually were impacted by the storm).

properties, residences, and infrastructure in the city's five boroughs located beyond Zone A, flooding many of the city's subways and tunnels.<sup>24</sup>

The storm's toll included forty-three deaths,<sup>25</sup> the total loss of approximately 300 homes,<sup>26</sup> 800,000 New York City residents and businesses without power,<sup>27</sup> the evacuation of five hospitals and thirty residential facilities that sustained flooding damage and power failures,<sup>28</sup> damage to 402 buildings covering 35,000 units of aging public housing stock owned by the New York City Housing Authority,<sup>29</sup> and the assignment of 6,800 persons forced to evacuate their homes to seventy-three city shelters.<sup>30</sup> In addition to the total destruction of small residential properties located in coastal areas in the city's boroughs of Staten Island, Queens, and Brooklyn, more than 80,000 residents of New York City Housing Authority (NYCHA) high-rise buildings were stranded without essential services for periods of time exceeding two weeks following the flooding of basements in which heating and electrical systems were located.<sup>31</sup> The storm's impact included: damage to fuel terminals, pipelines, and fueling stations that led to fuel shortages requiring rationing;<sup>32</sup> some 700,000 tons of refuse;<sup>33</sup> extensive damage to boardwalk and waterfront structures;<sup>34</sup> and the loss of "more than two million cubic yards of sand from city beaches."<sup>35</sup>

Meteorological analysis confirms that, as a storm system, Hurricane Sandy was three times the width of Hurricane Katrina in New Orleans.<sup>36</sup> A confluence of unusual weather occurrences—storm surge, high tide, wind velocity, and the storm's directional shift—led to an idiosyncratic event:<sup>37</sup> Sandy's arrival occurred during a full moon that contributed to tides approximately five percent higher than what usually

24. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 11, 13–14.

25. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 8.

26. PARTIAL ACTION PLAN A, *supra* note 20, at 1.

27. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 18.

28. *Id.* at 8.

29. The Worker Inst., *Union Leaders Agree on Need to Rebuild and Reform New York State's Energy System*, CORNELL U. ILR SCH. (Apr. 26, 2013), <http://www.ilr.cornell.edu/workerinstitute/news/NYS-Energy-System.html>.

30. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 16.

31. *Sandy's Effects on Housing in New York City*, FURMAN CTR. FOR REAL EST. & URB. POL'Y 4–5 (Mar. 2013), <http://www.furmancenter.org/files/publications/SandysEffectsOnHousingInNYC.pdf>.

32. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 21.

33. *Id.* at 22.

34. *Id.* at 23.

35. *Id.*

36. See Adam Voiland, *Comparing the Winds of Sandy and Katrina*, NASA (Nov. 6, 2012), <http://earthobservatory.nasa.gov/IOTD/view.php?id=79626&src=eoaiotd>.

37. Brooklyn Law School, *Sparer Public Interest Law Forum*, YOUTUBE (May 2, 2013), <http://www.youtube.com/watch?v=uxu3sgaiG1U> (Seth W. Pinsky, President, NYC Econ. Dev. Corp., Keynote Address at the Edward V. Sparer Public Interest Law Forum).

would occur.<sup>38</sup> In addition, the storm had taken a “leftward hook” over New Jersey and subjected New York City to particularly strong winds.<sup>39</sup> These factors led to the dramatic storm surge and waves that inundated many waterfront neighborhoods, notably the Rockaways, Midland Beach in Staten Island; Coney Island and Gerritsen Beach in Brooklyn; Orchard Beach in the Bronx; and the South Street Seaport in Lower Manhattan. At the southern tip of Manhattan, water levels at the Battery rose to fourteen feet.<sup>40</sup>

### B. Immediate Response

New York City has estimated that the steps it took in readiness for and in response to Superstorm Sandy represented one of the most extensive efforts to engage and deliver city services that the city has ever documented.<sup>41</sup> To prepare for the storm, the city implemented its Coastal Storm Plan, including centers for emergency operations, healthcare evacuation, and logistics.<sup>42</sup> In addition to ordering the evacuation of Zone A, before the storm hit, the city and Metropolitan Transportation Authority closed down the subway system to move cars and equipment to higher elevations and forestall the effects of flooding.<sup>43</sup> The city reported a series of steps that the housing authority took to alert its tenants to the mayor’s evacuation order for Zone A, including 33,000 phone calls to 19,000 units, posting multilingual flyers, knocking on the apartment doors of thousands of seniors and persons with disabilities, and, with the New York City Police Department, using bullhorns and vehicles with flashing lights to announce the evacuation order, supplying 200 buses to help transport housing authority residents out of evacuation Zone A.<sup>44</sup> Nevertheless, many housing authority residents remained in their apartments.<sup>45</sup> After the storm struck, the city, in conjunction with the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE), assigned ap-

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38. PARTIAL ACTION PLAN A, *supra* note 20, at 3.

39. *Id.*

40. *Id.*

41. *Id.* at 1.

42. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 4. The city has also had in place since 2007 a long-term sustainability planning document, PlaNYC 2030, updated in 2011, which includes a six-prong plan to address climate change. In addition to lowering greenhouse gas emissions, the plan calls for evaluating “vulnerabilities and risks from climate change,” improving the “resilience” of structures and communities, promoting public health, and enhancing the city’s “preparedness” for severe weather conditions. PLANYC, PLANYC 2011: A GREENER, GREATER NEW YORK, CHAPTER ON CLIMATE CHANGE 3 (2011) [hereinafter A GREENER, GREATER NEW YORK], *available at* [http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc\\_2011\\_climate\\_change.pdf](http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_climate_change.pdf)

43. PARTIAL ACTION PLAN A, *supra* note 20, at 4.

44. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 9–10.

45. *Id.* at 9. The results of a later survey of housing authority residents indicated that those surveyed who remained with knowledge that they were in an evacuation zone believed either that their buildings were not in danger or were structurally sound enough to withstand the storm. *Id.*

proximately 230 generators on a priority basis to hospitals, nursing homes, large multi-family buildings, and housing authority developments in the days following the storm.<sup>46</sup>

The city worked with local utilities to keep apprised of the extent of electrical power loss, which continued for approximately five days before power was returned to southern Manhattan.<sup>47</sup> However, many residences and businesses in the outer boroughs were without power for significantly longer periods of time.<sup>48</sup> Heat, hot water, and electric power were fully returned to all housing authority buildings on November 18.<sup>49</sup>

For evacuated persons housed in emergency shelters and unable to return to their homes, the city contracted with hotels to provide short-term evacuation sheltering,<sup>50</sup> which the city continued until October, when FEMA reimbursements ended.<sup>51</sup> Working with FEMA, the city inaugurated NYC Rapid Repairs, a program to restore power, heat, and hot water to private homes at no cost to the homeowners.<sup>52</sup> It was projected that the program would repair more than 11,700 homes consisting of more than 20,000 units.<sup>53</sup> The City's Department of Environmental Protection (DEP) and the Department of Transportation (DOT) pumped out many departmental facilities, including wastewater treatment plants, and worked closely with the U.S. Army Corps of Engineers and the U.S. Navy to pump out other infrastructure, including subways, tunnels, and street underpasses.<sup>54</sup>

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46. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 14.

47. PARTIAL ACTION PLAN A, *supra* note 20, at 3.

48. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 14.

49. *Id.*

50. PARTIAL ACTION PLAN A, *supra* note 20, at 4.

51. Mireya Navarro, *Hundreds of Storm Evacuees in Hotels Face Evictions*, N.Y. TIMES, Sept. 24, 2013, <http://www.nytimes.com/2013/09/25/nyregion/hundreds-of-storm-evacuees-in-hotels-face-evictions.html?pagewanted=1&r=0>. Thereafter, the Red Cross made funds available to allow these evacuated persons to remain in hotels as they sought replacement housing. *Some NYC Sandy Victims Remain in Hotels Thanks to Red Cross*, CBS NEW YORK (Oct. 5, 2013, 10:49 AM), <http://newyork.cbslocal.com/2013/10/05/some-nyc-sandy-victims-remain-in-hotels-thanks-to-red-cross/>.

52. PARTIAL ACTION PLAN A, *supra* note 20, at 5.

53. *Id.* The program generated some complaints of unprofessional work, and repairs exposing homeowners to unsafe conditions. *See, e.g.*, Marc Santia, *Violations Found in Sandy-Damaged Homes Repaired Though City Program*, CHANNEL FOUR NBC NEW YORK NEWS (May 16, 2013, 10:42 AM), <http://www.nbcnewyork.com/news/local/Staten-Island-Residents-Allege-Shoddy-Rapid-Repairs-From-New-York-City-Program-for-Sandy-Damaged-Homes-207646261.html>; Tara Palmeri, *Homeowners Blast Shoddy Repairs by Contractors Through FEMA's Rapid Repairs Program*, N.Y. POST, Jan. 28, 2013, <http://nypost.com/2013/01/28/homeowners-blast-shoddy-repairs-by-contractors-through-femas-rapid-repairs-program/>.

54. PARTIAL ACTION PLAN A, *supra* note 20, at 4.

Three days after the storm hit, the city and the National Guard established a food and water distribution center,<sup>55</sup> and one day after that established a fueling service for city vehicles, para-transit vehicles, and other first responders and recovery-related personnel.<sup>56</sup> To address health care needs, the city circulated eleven mobile medical vans to provide primary care and prescriptions to adults and children in the Rockaways, Brooklyn, and Staten Island.<sup>57</sup> The City, National Guard, and volunteers assisted the housing authority and other agencies to provide services to homebound persons.<sup>58</sup> The housing authority began drop-offs of food, and health checks for homebound residents on November 1 and reported that fourteen of seventeen food and water distribution areas were located near housing authority developments.<sup>59</sup> Despite these initiatives, the housing authority and other government agencies were unable to provide timely and adequate aid to many stranded residents; instead, members of resident associations within housing authority complexes and other autonomous community-based groups such as People's Relief and Occupy Sandy stepped into the breach to ensure that these residents received medical care, warm clothing, food, and water.<sup>60</sup>

The city opened Disaster Assistance Service Centers (DASCs) in areas that sustained extensive damage—Coney Island, the Rockaways, Staten Island, and Breezy Point—on Friday, November 2, four days after the storm.<sup>61</sup> Fifteen days after the storm, then Mayor Michael Bloomberg opened the first of nine Restoration Centers, described by the city as “one-stop-shops” for city, state, and federal resources for persons and businesses heavily affected by the storm.<sup>62</sup> In operation for approximately three months, the Restoration Centers concentrated on three areas: financial assistance, housing, and reconstruction.<sup>63</sup>

To support the recovery of businesses, the city created five Business Recovery Zones (BRZs) to centralize city resources and programs and offered low-interest loans and grants to businesses that sustained losses from flooding or power failures.<sup>64</sup> The city, through the New York City Industrial Development Authority (IDA), also waived some city and state sales taxes for the purchase of materials needed for rebuilding or other recovery.<sup>65</sup>

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55. *Id.* at 6.

56. *Id.* at 5.

57. *Id.* at 7.

58. *Id.* at 5–6.

59. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 28.

60. Daniel Marans, *In Coney Island Public Housing, People's Relief and Local Residents Fill Void Left by Government*, HUFFINGTON POST (Nov. 19, 2012, 1:00 PM), [http://www.huffingtonpost.com/daniel-marans/hurricane-sandy-peoples-relief\\_b\\_2128733.html](http://www.huffingtonpost.com/daniel-marans/hurricane-sandy-peoples-relief_b_2128733.html).

61. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 28.

62. *Id.* at 28.

63. *Id.*

64. *Id.* at 30–31.

65. *Id.* at 30.



### C. Interim Steps to Recovery

After the storm, the city initiated various reviews and measures intended both to help assess its preparedness for Superstorm Sandy and to plan to develop capacity for future weather events.<sup>66</sup> Most immediately, the city put together a plan sketching out its planned use of Community Development Block Grant funds to be made available under a federal relief package.<sup>67</sup> The city also produced an After Action Report looking back as well as forward to take account of the systems in place or those needed to enhance readiness to respond.<sup>68</sup> And a report issued in June 2013 as the culmination of the City's Special Initiative on Rebuilding and Resiliency (SIRR), headed by the New York City Economic Development Corporation, formulated mid- and long-term rebuilding plans for New York City.<sup>69</sup>

#### 1. Application for Community Development Block Grant Funds

On January 29, 2013, exactly three months after the date Hurricane Sandy struck the New York region, President Obama signed the Disaster Relief Appropriations Act of 2013, which includes \$16 billion<sup>70</sup> in Community Development Block Grant (CDBG) Recovery funds administered by the Department of Housing and Urban Development (HUD) to cover "necessary expenses related to disaster relief, long-term recovery, restoration of infrastructure and housing, and economic revitalization in the most impacted and distressed areas resulting from . . . Hurricane Sandy and other eligible events in calendar years 2011, 2012, and 2013."<sup>71</sup> The city's allocation under the HUD's first distribution of CDBG-DR funds was \$1,772,820,000,<sup>72</sup> and the federal government approved the city's plans for use of those funds.<sup>73</sup> The city allocated \$648

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66. See *NYC Recovery: Community Development Block Grant Disaster Recovery*, NYC.GOV, <http://www.nyc.gov/html/cdbg/html/home/home.shtml> (last visited April 16, 2014) [hereinafter *NYC Recovery*].

67. *Id.*

68. See generally NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1 (stating that "[t]he City's response to Hurricane Sandy began well before the storm and continues today, but we are far enough away from the immediate events of October and November 2012 to evaluate the City's performance to understand what went well and—as another hurricane season approaches—what can be improved."). *Id.* at 1.

69. See generally A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7 (stating "[w]e will make New York a stronger, more resilient city."). *Id.* at 7.

70. *NYC Recovery*, *supra* note 67.

71. Disaster Relief Appropriations Act of 2013, Pub. L. No. 113-2, 127 Stat 4, 35-36, available at <http://www.gpo.gov/fdsys/pkg/PLAW-113publ2/pdf/PLAW-113publ2.pdf>.

72. PARTIAL ACTION PLAN A, *supra* note 20, at 139.

73. Mireya Navarro, *City to Begin Distributing Storm Aid This Summer*, N.Y. TIMES, May 10, 2013, at A26, available at [http://www.nytimes.com/2013/05/10/nyregion/city-plans-to-dispense-nearly-2-billion-in-hurricane-aid-starting-this-summer.html?\\_r=0](http://www.nytimes.com/2013/05/10/nyregion/city-plans-to-dispense-nearly-2-billion-in-hurricane-aid-starting-this-summer.html?_r=0).

million for housing programs, \$293 million for business programs, \$360 million for infrastructure and other city services, \$294 million in resilience investments, and \$177 million in citywide administration and planning.<sup>74</sup> In addition to this allocation of CDBG monies, the New York City has had access to other federal funding, including grants from the Federal Emergency Management Agency, Small Business Administration Disaster Loans, National Flood Insurance Program disbursements, and other funds payable through the Disaster Relief Appropriations Act of 2013, as well as private insurance payouts, loans, and grants from the private (for profit and nonprofit) sector.<sup>75</sup>

## 2. The City's After Action Report

Developed by the New York City Mayor's Office, an assessment of after action working sessions and discussions with community partners produced fifty-nine recommendations in the categories of communications, evacuations, public safety, general and special medical needs sheltering, response and recovery logistics, community recovery services, and ongoing recovery.<sup>76</sup> The report organized the recommendations into seven discrete areas, emphasizing the need to improve the city's capacity to address the material and informational needs of its populace and to mobilize and coordinate relief efforts, including the provision of housing necessitated by storm-related relocations.<sup>77</sup>

The report disaggregated data pertaining to the impact of the storm on the New York City Housing Authority buildings and systems, and building residents.<sup>78</sup> In a tacit recognition of deficits in the city's systems to address the needs of vulnerable and homebound people, the

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74. Mike Bloomberg, *NYC's Plan for Hurricane Sandy Recovery Initiatives Approved*, MIKEBLOOMBERG.COM (May 10, 2013), <http://www.mikebloomberg.com/index.cfm?objectid=8F8A0649-C29C-7CA2-FED3D73B2EBF744C>.

75. PARTIAL ACTION PLAN A, *supra* note 20, at 32–36.

76. NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 5.

77. *Id.* The report's executive summary specified the following initiatives: "I. Improved evacuation, including updated evacuation zones and better, clearer communication to help New Yorkers understand how to protect themselves from the risk of severe weather. II. Improved accessibility of all coastal storm-related information and services to make them available to all New Yorkers, including persons with disabilities or special medical needs, homebound populations, non-English speakers, and undocumented immigrants. III. Better integration of the City's data across platforms and agencies to increase situational awareness and allow more targeted, efficient response and recovery operations. IV. Additional capacity to respond to large-scale building inundation and loss of power, including pre-storm identification of the equipment and skilled resources likely to be needed for building restoration and better coordination with private building owners. V. Better coordination of relief to affected areas and to vulnerable or homebound populations, including more efficient deployment of volunteers and donations to residents and business owners. VI. The development of a mid- to long-term housing plan for New Yorkers displaced by damage from coastal storms. VII. Partnership with the federal and state authorities that regulate and enforce standards for private companies and utilities that provide essential services to New York City residents." *Id.*

78. *See id.*

report included a chapter on Community Recovery Services with recommendations to institutionalize outreach and collaboration with community organizations and volunteers, including a “vulnerable populations/homebound door-to-door service Task Force and Action Plan.”<sup>79</sup> An appendix featured a survey of city residents living in Evacuation Zone A, designed to determine the extent to which they complied with, or otherwise responded to, the mayor’s evacuation order, in the interest of improving levels of compliance in the future.<sup>80</sup> With its emphasis on reconstructing and assessing the city’s response, this storm-related report (to a greater extent than the others the city has produced) focused attention on the human services dimension of its response.<sup>81</sup>

### 3. The Special Initiative on Rebuilding and Resiliency

Headed by the then New York City Economic Development Corporation President Seth Pinsky, the Special Initiative was charged with developing a mid- and long-term rebuilding plan accounting for climate change based on an analysis of the events and impact of Sandy (documenting what occurred and assessing why it occurred), what could eventuate, and how to rebuild and plan for climate change.<sup>82</sup> The SIRR mobilized multiple stakeholders to gain insight into how to proceed.<sup>83</sup> Indicating its “public engagement,” the report states that it consulted with more than thirty federal, state, and city government agencies, communicated with elected officials and community board members, conferred with more than 320 business and community-based organizations, held eleven public workshops, and did outreach to more than a 1,000 persons.<sup>84</sup>

With a ceremonious launch in June 2013,<sup>85</sup> the SIRR’s report, *A Stronger, More Resilient New York*, published under the auspices of PlaNYC 2030, the city’s blueprint for sustainable planning, announced that the “underlying goal of [the] report is resiliency.”<sup>86</sup> In a subsequent post by the City’s Office of Long Term Planning and Sustainability, the

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79. *Id.* at 25, 27, 30.

80. *Id.* at Appendix B.

81. *See generally id.* (stating that “[t]he recommendations in this report also focus on the ways the City can improve emergency response to help New Yorkers resume their lives and get back to work.”). *Id.* at 5.

82. Brooklyn Law School, *supra* note 37.

83. *Id.*

84. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 5.

85. *See A Stronger, More Resilient, New York: An Ambitious Proposal to Protect the City Against the Effects of Climate Change*, NYCEDC (June 11, 2013), <http://www.nycedc.com/blog-entry/stronger-more-resilient-new-york-ambitious-proposal-protect-city-against-effects-climate>.

86. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 6.

report was described as “not just a road map for long-term comprehensive resiliency planning for New York, but for cities worldwide.”<sup>87</sup> The report’s use of resilience/resiliency draws on popular understandings of the term and generally uses it in a way that assumes a unitary meaning.<sup>88</sup> And, with limited discussion of alternative strategies, the report equates resilience with rebuilding.<sup>89</sup> Part III will examine the city’s use of resilience in its post-Sandy and related climate change discourse and situate this usage in relation to a range of disciplines and practices that incorporate more nuanced and relevant understandings of resilience.

### III. RESILIENCE AS A DISCOURSE

The key to New York City’s projected post-Sandy expenditures outlined in the CDBG-DR Partial Action Plan A, and in its principal planning document, *A Stronger, More Resilient New York*, has been the asserted goal of implementing a set of plans and initiatives that ensure the city’s resiliency.<sup>90</sup> The concept of resilience/resiliency is also a core feature of the section on climate change in the city’s PlaNYC and related documents, such as *Vision 2020: New York City Comprehensive Waterfront Plan*.<sup>91</sup> Understanding what resilience means in the era of climate change is thus crucial to the analysis of the steps the city has undertaken or plans as it addresses the continued prospect of weather-related disasters.

#### A. Deconstructing Resilience

As a concept, resilience is highly developed in the psychological and ecological sciences, though the concept has also become more salient in the fields of international aid, disaster planning, management, and governance, including planning that specifically addresses climate change.<sup>92</sup> A recent Rockefeller Foundation-funded literature review of resilience across disciplines has identified three principal frameworks in which resilience is discussed: engineering resilience, which, in its concern with the capacity to withstand external disturbances and to return

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87. C40 Cities, *A Stronger, More Resilient New York*, C40CITIES BLOG (July 26, 2013), <http://c40.org/c40blog/a-stronger-more-resilient-new-york>.

88. See generally *A STRONGER, MORE RESILIENT NEW YORK*, *supra* note 7 (stating that “[t]he underlying goal of this report is resiliency. That is, to adapt our city to the impacts of climate change and to seek to ensure that, when nature overwhelms our defenses from time to time, we are able to recover more quickly.”). *Id.* at 6.

89. See generally *id.* at 7 (stating that “a resilient city is one that is . . . able to bounce back more quickly when [its] defenses are breached from time to time.”).

90. See *id.* at Foreword from the Mayor.

91. See, e.g., A GREENER, GREATER NEW YORK, *supra* note 43; CITY OF NEW YORK, *VISION 2020: NEW YORK CITY COMPREHENSIVE WATERFRONT PLAN* (2011) [hereinafter *VISION 2020*], available at [http://www.nyc.gov/html/dcp/pdf/cwp/vision2020\\_nyc\\_cwp.pdf](http://www.nyc.gov/html/dcp/pdf/cwp/vision2020_nyc_cwp.pdf).

92. PATRICK MARTIN-BREEN & J. MARTY ANDERIES, *RESILIENCE: A LITERATURE REVIEW* 4–5, 42–43 (2011), available at <http://www.rockefellerfoundation.org/blog/resilience-literature-review>.

rapidly to a normal state, accords with “colloquial” and “intuitive” conceptions of resilience;<sup>93</sup> systems resilience, which refers to the ability of a system to maintain its functions in the face of a disturbance;<sup>94</sup> and complex adaptive systems resilience, which includes the capacity to devise new ways of working, or reorganizing, when a disturbance occurs.<sup>95</sup>

In psychology, evolving definitions have shifted emphasis from a more static, outcome-focused conception to an understanding of resilience as a dynamic process involving “positive adaptation in the context of significant adversity,” a process that accords with a systems framework.<sup>96</sup> Psychological analyses of resilience appear in the literature of child development and family relations.<sup>97</sup> However, psychological resilience also applies in discussions of responses to trauma and disaster, and thus overlaps in some respects with disaster planning literature.<sup>98</sup>

Discussions of resilience in ecological systems increasingly conjoin the ecological with the social, recognizing the impact of human activity on natural ecosystems.<sup>99</sup> One inclusive definition of resilience encompasses the “ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation [sic], and the capacity to adapt to stress and change.”<sup>100</sup> Another application of resilience emphasizes the interaction between the social and the ecological systems, particularly the human capacity to turn to nature and realize an “ecological identity” as a mechanism of recovery after an extreme circumstance:

The ways in which we as humans reorganize, learn, recover and demonstrate resilience through remembering and operationalizing the value of our relationships with elements of our shared ecologies in the direst of circumstances such as disaster and war hold clues to how we might increase human resilience to new

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93. *Id.* at 5–6, 43.

94. *See, e.g., id.* at 6–7, 15–23 (demonstrating the framework of systems resilience in ecological and social-ecological systems).

95. *Id.* at 7–8, 45–46.

96. *Id.* at 44–45.

97. *Id.* at 34–36.

98. *Id.* at 23–24.

99. *Id.* at 15–17.

100. U.K. DEP’T FOR INT’L DEV., *DEFINING DISASTER RESILIENCE: A DFID APPROACH PAPER 6* (2011) [hereinafter *DEFINING DISASTER RESILIENCE: A DFID APPROACH PAPER*], available *at* <http://reliefweb.int/sites/reliefweb.int/files/resources/Defining%20Disaster%20Resilience%20A%20DFID%20Approach%20Paper%20%28new%20cover%29.pdf> (quoting the Intergovernmental Panel on Climate Change).

surprises, while contributing sources of social-ecological resilience to ecosystems.<sup>101</sup>

In the international aid context, resilience refers to the capacity of a nation, community, or household unit to resist and recover from a disaster.<sup>102</sup> The United Nations International Strategy for Disaster Reduction defines resilience as the “ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner.”<sup>103</sup>

In the specific context of climate change, resilience has been defined as:

The capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level. Simply put, it is the ability to survive and recover from the effects of climate change. It includes the ability to understand potential impacts and to take appropriate action before, during, and after a particular consequence to minimize negative effects and maintain the ability to respond to changing conditions.<sup>104</sup>

Climate change resilience encompasses adaptation and recovery strategies and presumes “systems [that] build redundancies of resources, multiple response paths, and safety nets.”<sup>105</sup>

In a similar vein, a preliminary report of the New York State 2100 Commission, recommending steps to protect the state’s infrastructure from weather-related disasters, defines resilience as:

The ability of a system to withstand shocks and stresses while still maintaining its essential functions. Therefore systems that are more vulnerable – i.e., those that are brittle, at stretched capacity, or with very low diversity – are more at risk of catastrophic consequences when the next shock event happens. Resilient systems are also better able to repair and recover afterwards.

Taken together, there are several features that are common to most resilient systems, including having spare or latent capacity (redundancy); ensuring flexibility and responsiveness; managing for safe failure

101. Keith Tidball, *Mechanisms of Resilience & Other ‘Re-Words’ in Urban Greening*, NATURE OF CITIES (Apr. 24, 2013), <http://www.thenatureofcities.com/2013/04/24/mechanisms-of-resilience-other-re-words-in-urban-greening/>.

102. DEFINING DISASTER RESILIENCE: A DFID APPROACH PAPER, *supra* note 101, at 6.

103. *Id.*

104. ROCKEFELLER FOUNDATION, BUILDING CLIMATE CHANGE RESILIENCE 1 (2009) [hereinafter BUILDING CLIMATE CHANGE RESILIENCE], *available at* <http://www.rockefellerfoundation.org/uploads/files/c9725eb2-b76e-42eb-82db-c5672a43a097-climate.pdf>.

105. *Id.* at 3.

(building resistance to domino effects); and having the capacity to recover quickly and evolve over time – to thrive, not just survive major disruptions.<sup>106</sup>

### B. The City's Discourse of Resilience

New York City's discussion of resilience in PlaNYC invokes the plan's overarching focus on sustainability.<sup>107</sup> For example, PlaNYC's chapter on climate change includes two of six goals specifically tied to resilience, one addressed to buildings, infrastructure, and coastal protection,<sup>108</sup> and the other related to communities.<sup>109</sup> In a recent update to PlaNYC, the city has included twenty-nine "Sustainability Indicators" consisting of metrics and targets in a range of categories (housing, parks, brownfields, waterways, water supply transportation, energy, air quality, solid waste, and climate change).<sup>110</sup> The goal/metric for climate change is to "increase the resilience of our communities, natural systems, and infrastructure to climate risks."<sup>111</sup> Initiatives to enhance climate resilience in buildings, transportation, housing, parks, waterways, and energy are specifically tied to sustainability.<sup>112</sup>

Certainly, resilience and sustainability are connected ideas;<sup>113</sup> sustainability has been described as a more encompassing term related to concerns of preserving resources over the longer term, though the attribute of resilience can foster sustainability, particularly in the face of disturbances recurring over time.<sup>114</sup> Sustainability, however, is itself a supple term used in "bio-scientific" contexts,<sup>115</sup> concerned with limits on available resources, and also in a "political-economic" sense.<sup>116</sup> Anthropologist Melissa Checker has argued that, in New York City, a "discourse of sustainability" related to "green" urban planning is, in effect, a form of governance that presents as a "technocratic, politically neutral

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106. NYS 2100 COMMISSION, *supra* note 15, at 24.

107. *See* A GREENER, GREATER NEW YORK, *supra* note 43, at 151.

108. *Id.* (Goal: "Increase the resilience of the city's built and natural environments.").

109. *Id.* (Goal: "Create resilient communities though [sic] public information and outreach.").

110. *Id.* at 178–79.

111. *Id.* at 179.

112. *See id.* at 152, 154.

113. *See* Ezio Manzini, *Small, Local, Open and Connected: Resilient Systems and Sustainable Qualities*, CHANGE OBSERVER (Feb. 6, 2013), <http://changeobserver.designobserver.com/feature/small-local-open-and-connected-resilient-systems-and-sustainable-qualities/37670/>.

114. MARTIN-BREEN & ANDERIES, *supra* note 93, at 14.

115. Gary McDonogh, Cindy Isenhour & Melissa Checker, *Introduction: Sustainability in the City: Ethnographic Approaches*, 23 CITY & SOC'Y 113, 113–14 (2011).

116. *Id.* at 114 (quoting Erik Swyngedouw, *The Post-Political Condition and the Environment 2* (2011) (unpublished manuscript)).

approach to solving environmental problems.”<sup>117</sup> The very “ubiquity and ambiguity of sustainability,” she and other commentators suggest, threaten to overwhelm its ecological/environmental meaning and to blunt its association with environmental justice considerations.<sup>118</sup> For example, the fact that sustainability has been the catchphrase of the city’s growth-oriented initiatives<sup>119</sup> reveals its susceptibility to overuse and a resulting loss of meaning.

The centrality of resilience to the city’s official discourse concerning climate change and weather disasters exhibits a similar broadening, and blunting, of the term. As discussed, in the climate change context, resilience refers to the capacity of systems to adapt to climate change, including sea level rise.<sup>120</sup> *Vision 2020*, the city’s comprehensive water-front plan issued under the auspices of PlaNYC, describes climate resilience as “[a]daptations to our environment to increase the city’s ability to withstand and recover quickly from weather-related events.”<sup>121</sup> *A Stronger, More Resilient New York* defines a resilient city as “one that is: first, protected by effective defenses and adapted to mitigate most climate impacts; and second, able to bounce back more quickly when those defenses are breached from time to time.”<sup>122</sup> These definitions accord with a systems function framework for analyzing resilience.<sup>123</sup>

As noted, resilience also refers to the capacity of humans to respond to challenging circumstances, a concept that has been developed in the psychological and international aid literature.<sup>124</sup> The city’s post-Sandy climate change discourse adapts and popularizes this usage by equating resilience with the idea of fortitude, tenacity, and resolve (“In short, we have to be tough. And toughness, as we all know, is one of the defining traits of New Yorkers.”).<sup>125</sup> Resilience is also linked to a “can do” mindset (“Out of the heartbreaking catastrophe that was Sandy has come this *can*-do, *must*-do, *will*-do plan.”).<sup>126</sup> In these usages, the city adopts a more colloquial approach to the term and only rarely refers to the specific, discipline-based meanings that resilience has accrued in relation to climate science and systems analysis. Like the city’s discourse of sustainability, the city’s principal post-Sandy resilience text tends to conflate these meanings with a discourse that is part motivational and part urban-boosterism, and tied to the city’s commitment to continued water-front development.

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117. Melissa Checker, *Wiped Out by the “Greenwave”: Environmental Gentrification and the Paradoxical Politics of Urban Sustainability*, 23 CITY & SOC’Y 210, 212 (2011).

118. McDonogh, Isenhour & Checker, *supra* note 116, at 113; *id.* at 212.

119. See Checker, *supra* note 118, at 220–21.

120. See VISION 2020, *supra* note 92, at 110.

121. *Id.* at 106.

122. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 7.

123. See MARTIN-BREEN & ANDERIES, *supra* note 93, at 7.

124. See DEFINING DISASTER RESILIENCE: A DFID APPROACH PAPER, *supra* note 101, at 8.

125. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 6.

126. *Id.* at 7.



#### IV. A SPECTRUM OF RESILIENCE STRATEGIES: WHAT THE CITY CAN DO

The Rockefeller Foundation's *White Paper on Building Climate Change Resilience*, published in 2009, now seems particularly prescient, as it noted New York City's particular climate challenges: climate modeling had pointed to New York's vulnerability to storm surges, hurricanes, and flooding.<sup>127</sup> Moreover, the *White Paper* recognized a critical geographic fact that was implicated in post-Sandy recovery efforts: New York City's density and limited land mass, the *White Paper* predicted, would complicate post-disaster housing options, such as mobile homes.<sup>128</sup>

As climate scientists confirm, warming climates result in sea level rises that lead to storm surges.<sup>129</sup> As a coastal city facing sea level rise, a municipality such as New York City is clearly vulnerable. In 2009, the New York City Panel on Climate Change, a body of climate, legal, and risk management specialists called into being by then New York City Mayor Bloomberg, issued a report projecting as "extremely likely" a mean annual sea level rise in New York of between two to five inches by the 2020s and a mean annual rise of between seven to twelve inches by the 2050s.<sup>130</sup> A 2011 study by scientists at the Lamont-Doherty Earth Observatory of Columbia University, assessing the relationship of climate-induced sea level rise to storm surges and flooding in the New York City Metropolitan area, highlighted in particular the need to develop strategies to address the risks of surges to transportation infrastructure:

We submit that the rising awareness of an increased climate-change-related risk exposure for the region's infrastructure (and of other assets as well) can provide the overdue impetus to de-

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127. BUILDING CLIMATE CHANGE RESILIENCE, *supra* note 105, at 5.

128. *Id.* See also NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 16 (noting the City's assignment of evacuees to local hotels over a protracted period while these individuals sought appropriate housing alternatives). For a further discussion of the difficulties encountered by residents of the City's hotel program, see Nabila Taj, *In the Wake of Superstorm Sandy, Rebuild or Retreat?* 8–9 (Dec. 2013) (student paper on file with the author).

129. See, e.g., *SEAS Expert Weighs in on Hurricane Sandy*, COLUMBIA ENGINEERING (Oct. 31, 2012), <http://engineering.columbia.edu/columbia-engineering-atmospheric-expert-weighs-hurricane-sandy>. See also NEW YORK CITY PANEL ON CLIMATE CHANGE, CLIMATE RISK INFORMATION 2013: OBSERVATIONS, CLIMATE CHANGE PROJECTIONS, AND MAPS, 14–16 (2013) [hereinafter CLIMATE RISK INFORMATION 2013], available at [http://www.nyc.gov/html/planyc2030/downloads/pdf/npcc\\_climate\\_risk\\_information\\_2013\\_report.pdf](http://www.nyc.gov/html/planyc2030/downloads/pdf/npcc_climate_risk_information_2013_report.pdf).

130. NEW YORK CITY PANEL ON CLIMATE CHANGE, CLIMATE RISK INFORMATION 3 (2009) (footnote omitted), available at [http://www.nyc.gov/html/om/pdf/2009/NPCC\\_CRI.pdf](http://www.nyc.gov/html/om/pdf/2009/NPCC_CRI.pdf).

velop and implement effective coping strategies and overcome the past tendency of risk denial by both private and public sectors. Although there is quantifiable uncertainty associated with the expected increase in risk, it becomes clear that even without climate-change-related increments of risk, coping strategies are needed because the volume and aggregate value of exposed assets are increasing with time. The uncertainty of the exact increment of risk due to sea level rise and global warming can therefore not serve as an excuse to avoid dealing with the region's storm surge risk. The coping strategies to be explored are likely to include a mixture of modern engineering solutions, regulatory measures, taxation and/or financial or insurance discounting, and—as the ultimate tool—innovative land use combined with buyouts and relocations. Costs and benefits of these various options, including the mounting costs of not facing these issues at all, need to be addressed quantitatively in forthcoming studies. They could not be resolved in this initial phase of assessment. This assessment does however clearly show the magnitudes of problems that will need to be tackled.<sup>131</sup>

In a post-Sandy interview, the Columbia study's lead author, Klaus Jacob, emphasized the need for regional land use policies rather than the application of the municipal home rule, which in New York State generally permits local governments to regulate land use and development.<sup>132</sup> The recommendation for a regional approach was seconded by the state-level NYS 2100 Commission's preliminary report addressing ideas to improve the resilience of New York State's infrastructure,<sup>133</sup> and also by the report of the Hurricane Sandy Rebuilding Task Force, chaired by Secretary of Housing and Urban Development, Shaun Donovan.<sup>134</sup>

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131. KLAUS H. JACOB, ET AL., CLIMATE CHANGE AND A GLOBAL CITY: AN ASSESSMENT OF THE METROPOLITAN EAST COAST (MEC) REGION 4 (2011), available at [http://metroeast\\_climate.ciesin.columbia.edu/reports/infrastructure.pdf](http://metroeast_climate.ciesin.columbia.edu/reports/infrastructure.pdf).

132. Mark Fischetti, *How to Survive the Next Big Storm: Q&A with Klaus Jacob*, SCI. AM. (Nov. 7, 2012), <http://www.scientificamerican.com/article.cfm?id=how-to-survive-the-next-big-storm>.

133. NYS 2100 COMMISSION, *supra* note 15, at 139. At the same time that region-wide responses have been favored, New York State Governor Cuomo introduced the concept of Community Reconstruction Zones, described as a “bottom up” process to generate locally driven but federally funded rebuilding initiatives that reflect the priorities of communities extensively damaged by the storms Sandy, Irene, or Lee. Press Release, Governor's Press Office, Governor Cuomo Announces Community Reconstruction Zones Funded by Federal Supplemental Disaster Aid to Guide Local Rebuilding Process (Apr. 26, 2013), available at <http://www.governor.ny.gov/press/04262013cuomo-reconstruction-federal-disaster-aid>.

134. HURRICANE SANDY REBUILDING TASK FORCE, HURRICANE SANDY REBUILDING STRATEGY: STRONGER COMMUNITIES, A RESILIENT REGION 36–37 (Aug. 2013), available at [portal.hud.gov/hudportal/documents/huddoc?id=hsrebuildingstrategy.pdf](http://portal.hud.gov/hudportal/documents/huddoc?id=hsrebuildingstrategy.pdf) (recommending regional coordination of infrastructure planning and strengthening). See generally *id.* at 49–83.

The city's own waterfront plan, Vision 2020, (released the same year as the Columbia study) called for balanced action on climate resilience by considering risk of loss to properties and persons resulting from floods, the ecological benefits of allowing wetlands development in coastal areas, as well as other "public priorities such as waterfront access and economic development."<sup>135</sup> The plan assumed that there would be "an opportunity for planning, with periodic re-evaluation of risks and strategies as climate science evolves," relying on projections that, at the time, predicted more extensive effects of sea level rise and flooding in the 2050s.<sup>136</sup> These assumptions were called into question in June 2013, however, when the New York City Panel on Climate Change released a report revising and increasing its earlier projections of sea level rise; these included mid-range projections of between four and eight inches by the 2020s with a high estimate of eleven inches, and by the 2050s, mid-range projections of between eleven and twenty-four inches, with a high estimate of thirty-one inches.<sup>137</sup>

Whether the resilience strategies adopted are at a local or regional level, a range of options are available to New York City and its environs to plan for, mitigate, and otherwise adapt to risks presented by global warming and sea level rise. These potential responses fall broadly into three categories that have been described as protection, accommodation, and managed retreat measures;<sup>138</sup> and implicate the full range of a city's sovereign powers—police, eminent domain, and where needed to supplement intergovernmental aid, revenue-raising powers.<sup>139</sup> However, as discussed more fully below, the city has mainly rejected retreat measures. Recalling its use of the discourse of resilience, the city has slipped into the colloquial use of the term "retreat" as a surrendering to climate change and abandonment of the coastline, which runs the risk of overwhelming the word's more specific meaning as an urban land use policy and strategy for responding to climate change.

Typically, protection strategies include "hard armoring" mechanisms (such as sea walls, bulkheads, levees, and riprap or revetments) which entail installing large boulders or concrete structures at shorelines, and "soft armoring" such as the use of wetlands or sand dunes to

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135. VISION 2020, *supra* note 92, at 106.

136. *Id.*

137. CLIMATE RISK INFORMATION 2013, *supra* note 130, at 5.

138. VISION 2020, *supra* note 92, at 109–110; see also Megan M. Herzog & Sean B. Hecht, *Combating Sea Level Rise in Southern California: How Local Governments Can Seize Adaptation Opportunities While Minimizing Legal Risk*, 19 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 463, 491 (2013).

139. *See, e.g.*, Herzog & Hecht, *supra* note 139, at 466 (listing some of the legal issues involved in planning for rising sea levels in California).

create natural buffers.<sup>140</sup> In Sandy's aftermath, ideas for innovative protection-based coastal initiatives are beginning to appear. A consortium of architects and planners spearheaded by New York's chapter of the American Institute of Architects released a report that, among other things, has proposed experimental measures to protect New York City's waterfront,<sup>141</sup> including: seawalls and wave walls that weaken and break up storm surges; model waterfront districts with "distributed" energy, waste, sewer, and water systems; floating habitats; natural and armored dunes of various materials; and incorporated wind and hydro-power into waterfront buildings and infrastructure.<sup>142</sup>

The city's initiatives in *A Stronger, More Resilient New York* include a variety of hard armoring protective proposals, including installing revetments and bulkhead repairs to raise coastal edge elevations, adding storm surge barriers in Newtown Creek (a Superfund site),<sup>143</sup> and floodwalls or levees in various locations to protect against storm surge.<sup>144</sup> The city is also pursuing soft initiatives involving dunes and wetlands to slow down erosion and break down wave action.<sup>145</sup> In a related development, New York City is currently soliciting expressions of interest from collaborators to finance a pilot "wetlands mitigation bank" in the borough of Staten Island.<sup>146</sup> The bank is an arrangement that allows those seeking to develop waterfront property to purchase credits to finance restoration and maintenance of a pre-identified wetlands mitigation site,<sup>147</sup> which, in turn, can perform a valuable ecological function by serving as a natural storm barrier.<sup>148</sup> The idea would be to assign credits to builders participating in wetlands projects that would, in turn, be sold to developers of coastal land "in other parts of Staten Island."<sup>149</sup> By financing the wetlands restoration the purchased credits would, it is thought, balance the environmental effects of the credit purchasers' own coastal development.<sup>150</sup>

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140. *Id.* at 492–97; *see also* VISION 2020, *supra* note 92, at 110.

141. Matt Chaban, *Architects Dream Up Rebuilding Innovations*, CRAIN'S N.Y. BUS. (May 10, 2013, 10:48 AM), [http://www.crainsnewyork.com/article/20130510/REAL\\_ESTATE/130519994](http://www.crainsnewyork.com/article/20130510/REAL_ESTATE/130519994).

142. POST-SANDY INITIATIVE, BUILDING BETTER, BUILDING SMARTER: OPPORTUNITIES FOR DESIGN AND DEVELOPMENT 39 (May 2013), *available at* [http://postsandyinitiative.org/wp-content/uploads/2013/05/Post-Sandy-Report\\_Full.pdf](http://postsandyinitiative.org/wp-content/uploads/2013/05/Post-Sandy-Report_Full.pdf).

143. Mireya Navarro, *Newtown Creek Is Declared a Superfund Site*, N.Y. TIMES, Sept. 27, 2010, [http://www.nytimes.com/2010/09/28/nyregion/28newtown.html?\\_r=0](http://www.nytimes.com/2010/09/28/nyregion/28newtown.html?_r=0).

144. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 51–53, 55–56.

145. *Id.* at 51–54.

146. Press Release, N.Y. City Econ. Dev. Corp. NYCEDC Releases Request for Expressions of Interest to Establish First Wetlands Bank in New York City (Dec. 20, 2013), *available at* <http://www.nycedc.com/press-release/nycedc-releases-request-expressions-interest-establish-first-wetlands-bank-new-york>.

147. *Id.*

148. VISION 2020, *supra* note 92, at 110.

149. Nicholas Rizzì, *City Seeks Developers to Restore Staten Island Marsh*, DNAINFO N.Y. (May 14, 2013, 7:48 AM), <http://www.dnainfo.com/newyork/20130514/bloomfield/city-seeks-developers-restore-staten-island-marsh>.

150. *Id.*

Accommodation measures, on the other hand, use a municipality's existing zoning and building code regulatory authority to improve resilience to sea level rise.<sup>151</sup> Possibilities include changing foundation height levels, requiring the placement of electrical and other critical systems at substantially higher elevations in structures near coastal areas,<sup>152</sup> as well as redesign of subway entrances and ventilation methods to avoid or reduce the risk of flooding.<sup>153</sup> New York has incorporated ideas along these lines in *A Stronger, More Resilient New York*, including various proposals to amend the zoning and construction codes and retrofit public housing, hospitals, and nursing homes to increase their resilience to flooding.<sup>154</sup>

Retreat mechanisms typically bar or limit development in flood-prone areas.<sup>155</sup> By directing development away from areas at risk of surges and flooding, they avoid thwarting the inland movement of ecosystems. For example, "rolling development" links land-use tools to a shifting mean high tideline to ensure that development is adapted to rising sea levels.<sup>156</sup> Other approaches include: government buyouts of developed property in flood-vulnerable areas, use of the land instead for open space or wetlands, allowing sale of development rights by property owners in flood-prone areas to owners in nearby locations, and conservation easements in which government gains a right to restrict development of property owned by others.<sup>157</sup> The value of these measures includes cost savings because non-development obviates the need for upkeep of coastal structures and limits the occasion for loss or harm from storm surge and sea level rise.<sup>158</sup>

In the years before Sandy, New York had largely rejected retreat measures citing the density of development in the city, the infeasibility

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151. Herzog & Hecht, *supra* note 139, at 501.

152. VISION 2020, *supra* note 92, at 109–110. Such elevation measures would benefit residents in Housing Authority and other high-rise buildings. *See id.*

153. *See, e.g.,* Fischetti, *supra* note 133; *see also* NYS 2100 COMMISSION, *supra* note 15, at 53. Even without local regulation, as a practical matter, homeowners seeking to rebuild damaged property may be forced to raise foundation levels to conform to the Federal Emergency Management Agency's base flood elevations and thus avoid higher flood insurance premiums. Eugene Paik, *What Sandy Victims Need to Know About New Height Rules for Their Homes*, NJ.COM (Feb. 5, 2013, 7:00 AM), [http://www.nj.com/news/index.ssf/2013/02/what\\_sandy\\_victims\\_need\\_to\\_kno.html](http://www.nj.com/news/index.ssf/2013/02/what_sandy_victims_need_to_kno.html).

154. *See* A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 419–20, 423.

155. VISION 2020, *supra* note 92, at 109.

156. Herzog & Hecht, *supra* note 139, at 476. For a comprehensive analysis of managed retreat measures, see Anne Siders, *Managed Coastal Retreat: A Legal Handbook on Shifting Development Away from Vulnerable Areas* (Columbia Pub. Law Res. Paper No. 14-365, 2013), available at [http://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Publications/Fellows/ManagedCoastalRetreat\\_FINAL\\_Oct%2030.pdf](http://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Publications/Fellows/ManagedCoastalRetreat_FINAL_Oct%2030.pdf).

157. Siders, *supra* note 157, at 6–7.

158. *Id.* at 2.

of moving infrastructure such as transit and sewer lines, the threat of displacing residents, as well as the incompatibility of retreat strategies with the PlaNYC goals for coastal development.<sup>159</sup> The city does, however, support an innovative buyout program, the New York Rising Housing Recovery Program, initiated by New York State Governor Cuomo under Community Development Block Grant Disaster Recovery funding.<sup>160</sup> The initiative is going forward in sections of Staten Island (part of New York City) and Suffolk County (east of the city), and combines aspects of shoreline protection strategies with encouraging relocation to less vulnerable areas,<sup>161</sup> in effect, a form of managed retreat. Under the plan, which was approved by the Department of Housing and Urban Development, the State offers to buy out homeowners in coastal areas that sustained extensive damage at pre-storm market values.<sup>162</sup> These properties would not be rebuilt, but rather developed as wetlands, other natural sources of coastal protection against storm action, or as public park land.<sup>163</sup> Under the State's proposal, homeowners in areas considered to be at serious future risk of flooding would be offered an additional bonus as an incentive to relocate.<sup>164</sup>

However, New York City's support of this measure is an exception to its general reluctance to consider retreat initiatives, as mirrored in its resilience rhetoric:

**We can embrace our coastline.** A strong coastline—with vibrant waterfront neighborhoods, critical infrastructure, and cherished natural and cultural resources—is essential to New York's present and future. We can fight for and rebuild what was lost, fortify the shoreline, and develop waterfront areas for the benefit of all New Yorkers. The city cannot, and will not, retreat.<sup>165</sup>

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159. VISION 2020, *supra* note 92, at 109.

160. See A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 419 (describing the initiative as the "New York Smart Home Buyout Program" and indicating "CDBG" as the program's funding source).

161. Press Release, Governor's Press Office, Governor Cuomo Announces State to Extend Buyout Program for Staten Island Homeowners Affected by Superstorm Sandy (Nov. 18, 2013), available at <https://www.governor.ny.gov/press/11182013-staten-island-homeowners-affected-by-hurricane-sandy>.

162. *Id.*

163. See *id.*

164. *Id.*; Thomas Kaplan, *Cuomo Seeking Home Buyouts in Flood Zones*, N.Y. TIMES, Feb. 3, 2013, <http://www.nytimes.com/2013/02/04/nyregion/cuomo-seeking-home-buyouts-in-flood-zones.html?hp&r=0>. Though mainly focused on rebuilding, a separate limited-term City program, Build it Back, permits homeowners to sell to the city; however, unlike the State program, the City will rebuild a storm-fortified property on the acquisition site. *E.g.*, Erin Durkin, *Widow Sells Sandy-Ravaged Home to NYC in First Build It Back Program Buy*, N.Y. DAILY NEWS, Oct. 10, 2013, 8:26 PM, <http://www.nydailynews.com/new-york/sandy-wrecked-home-sale-nyc-rebuilding-program-article-1.1482323>; see Taj, *supra* note 129, at 9, 18; Aaron Samsel, *Which Vulnerability? Whose Resilience?* 2–3 (Dec. 19, 2013) (student paper on file with the author).

165. A STRONGER, MORE RESILIENT NEW YORK, *supra* note 7, at 7.

This commitment to coastal development is reflective of local governments' general preference for development that maximizes economic returns.<sup>166</sup> It also reflects coastal area residents' attachment to their homes and neighborhoods and general reluctance to abandon them.<sup>167</sup> This development preference is facilitated by federal disaster relief policies that promote rebuilding and replacing preexisting structures rather than creating incentives for alternative responses such as managed retreat.<sup>168</sup> Building up the waterfront, however, requires construction or extension of infrastructure and, in turn, necessitates the kind of structural (hard) armoring strategies discussed in this section.<sup>169</sup> Yet, overreliance on such strategies is a costly alternative and requires investment in maintenance or replacement of these armoring structures.<sup>170</sup> Further, when these protective measures are breached, coastal buildings, infrastructure, and residents are put at risk.<sup>171</sup>

Recognizing the practical difficulties entailed in using retreat strategies in a developed urban area, the costs and risks of promoting further waterfront development in flood-prone areas, including a sustained campaign to rebuild storm-damaged properties, counsel in favor of further consideration of additional forms of managed retreat as a strategy of resilience for New York City.

#### V. THE SOCIAL DIMENSIONS OF WEATHER DISASTER: WHAT THE CITY SHOULD DO

Data and ideas proliferate about how coastal cities, and in particular New York City, can pursue strategies of resilience to help withstand the next weather-related onslaught and fulfill its responsibilities to protect those living and working within its borders. The needed responses go beyond land-use measures and require upgraded emergency systems, including effective communications strategies that can be mobilized before an extreme weather event to better implement evacuation initia-

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166. *See id.* at 6–7.

167. Siders, *supra* note 157, at 2.

168. *See* THOMAS A. BIRKLAND, LESSONS OF DISASTER: POLICY CHANGE AFTER CATASTROPHIC EVENTS 178–79 (2006); Kate Sheppard, *Flood, Rebuild, Repeat: Are We Ready for a Superstorm Sandy Every Other Year?*, ATLANTIC CITIES (July 29, 2013), <http://www.theatlanticcities.com/politics/2013/07/flood-rebuild-repeat-are-we-ready-superstorm-sandy-every-other-year/6352/>. *But see* the Biggert-Waters Flood Insurance Reform Act of 2012, Pub. L. No. 112-141, §§ 100215(d), 100216 (b) (H.R.4348, 112th Cong., 2012), available at <http://www.gpo.gov/fdsys/pkg/BILLS--112hr4348enr/pdf/BILLS--112hr4348enr.pdf>, which will increase insurances rates for property located in floodplains. By gradually requiring property owners to assume more of the costs of rebuilding, this legislation might have the effect of promoting relocation. Siders, *supra* note 157, at 9-13.

169. Sheppard, *supra* note 169.

170. *Id.*

171. *Id.*

tives and that can function even after power sources are compromised, as well as adequate shelter and housing options that reflect the city's density and the complicated needs of its vulnerable populations.<sup>172</sup> At a minimum, what is needed is an overall approach to planning that incorporates the core elements of systems resilience<sup>173</sup> and considers a full range of approaches to climate change adaptation, including managed coastal retreat where it is feasible.<sup>174</sup> At the same time, a city's approach to developing resilience measures should be informed by the social factors that can affect vulnerability and the capacity for human resilience, including financial and social capital, race, age, gender, and disability.<sup>175</sup>

In the developing field of vulnerability studies, scholars address the intersection of the physical/meteorological and the social/economic.<sup>176</sup> Sociologist Kathleen Tierney discusses three "axes of inequality," social class, race and ethnicity, and gender, as key determinants of vulnerability and resilience in the face of an impending disaster calling for evacuation.<sup>177</sup> Social class and access to resources generally position some individuals as more vulnerable in a disaster because they are more likely to be renters with less control over housing arrangements, their housing is more likely to be inadequate, they may have difficulty accessing reliable transportation in the event of the need to evacuate, fewer viable shelter options upon evacuation, and difficulty qualifying for household disaster assistance if part of a combined or extended household.<sup>178</sup>

Race and ethnicity also affect vulnerability to disaster and capacity for resilience.<sup>179</sup> Thus, communities comprising racial minorities and immigrant groups may have less trust of official directives concerning evacuation, and concern about what might eventuate if they comply (separation and loss of household goods and documentation).<sup>180</sup> Language minorities also may be disproportionately disadvantaged during a disaster if warnings are not offered in multiple languages or in an equivalent level of detail as official sources.<sup>181</sup> Related to race and ethnicity and also to class and social capital are the factors of age and isolation,<sup>182</sup> as sociologist Eric Klinenberg has documented extensively in his

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172. *See generally id.*

173. These comprise providing for redundancy or back-up capacity in key systems; maintaining flexibility in responding to evolving conditions; limiting system failure, that is, avoiding a "domino" effect; ensuring the ability to rebound quickly; and integrating ongoing learning from experience. NYS 2100 COMMISSION, *supra* note 15, at 25.

174. *See id.* at 24–25.

175. *See id.*

176. Kathleen Tierney, *Social Inequality, Hazards, and Disasters*, in ON RISK AND DISASTER: LESSONS FROM HURRICANE KATRINA 109, 111 (Ronald J. Daniels, Donald F. Kettl & Howard Kunreuther eds. 2006).

177. *Id.* at 113–20 (the quoted phrase appears on page 113).

178. *Id.* at 113–16.

179. *Id.* at 118–19.

180. *Id.* at 116–19.

181. *Id.* at 117–18.

182. *Id.* at 119.



study of the impact of poverty, age, and degree of connection to community networks on vulnerability to the effects of a heat wave in Chicago in 1995.<sup>183</sup> Klinenberg's research revealed how, among lower-income racial minority groups, members of African-American and Latino communities that otherwise seemed similarly situated in terms of urban location, housing arrangements, and income level, showed different levels of vulnerability and ability to cope during the heat wave based on whether they had access to strong community networks and institutions.<sup>184</sup>

Intersecting with these other factors are characteristics associated with gender.<sup>185</sup> Some research has highlighted how women's unequal access to income and employment opportunities, their frequent role as caregivers responsible for minor and elder members of households, and, in some situations, their lack of equal authority in a household for making decisions concerning how to respond to a disaster or access disaster relief, may increase their vulnerability.<sup>186</sup>

The experience in New York City during and after Superstorm Sandy substantiates the degree to which social factors and social inequality exacerbate vulnerability and affect the capacity for resilience.<sup>187</sup> As noted, public housing residents were among the populations disproportionately affected by the storm because many New York City Housing Authority buildings are located in flood-prone areas and lost the capacity to provide heat, hot water, and electricity when critical systems were flooded.<sup>188</sup> Elderly and disabled residents in these high-rise apartment buildings were particularly affected because they were unable to evacuate; instead, they remained stranded in apartments in precarious situations with limited access to food and medication, in addition to exposure to the cold.<sup>189</sup> Added to these concerns was the New York City Housing Authority's inability to identify in which units many of these disabled residents were located.<sup>190</sup> It was in this context that the New York Resilience System network sprang into action in the beleaguered Rockaways, mobilizing representatives of the nonprofit, government,

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183. See, e.g., Eric Klinenberg, Heat Wave: A Social Autopsy of Disaster in Chicago 37–78 (2002).

184. *Id.* at 79–128.

185. See Tierney, *supra* note 176, at 119–21.

186. *Id.* at 120–21.

187. See Lipton & Moss, *supra* note 4.

188. *See id.*

189. Mireya Navarro, *Public Housing Residents Relying on Agency Still Recovering From Storm*, N.Y. TIMES, Oct. 29, 2013, <http://www.nytimes.com/2013/10/30/nyregion/public-housing-residents-relying-on-agency-still-recovering-from-storm.html?r=1&pagewanted=all>.

190. *Id.*

and private sectors to deliver post-Sandy relief,<sup>191</sup> and autonomous community-based groups such as People's Relief and the actions of residents in other housing authority complexes supplemented and at times appeared to substitute for the city government's own capacity to respond to these vulnerable residents.<sup>192</sup>

The fact that disability is a critical consideration in assessing vulnerability and resilience was highlighted in a recent federal district court ruling in which the court held that New York City failed to properly accommodate the needs of disabled residents during emergencies, in violation of the Americans with Disabilities Act.<sup>193</sup> In *Brooklyn Center for Independence of the Disabled v. Bloomberg*, a lawsuit commenced in 2011 after Hurricane Irene, but given added urgency after Superstorm Sandy, Judge Jesse Furman of the U.S. District Court for the Southern District of New York found that New York City's emergency preparedness plan had failed to develop adequate evacuation plans for disabled persons living in high-rise buildings, and failed to afford access to public transportation, the city's shelter system, or other city services.<sup>194</sup> The court also concluded that the city failed to plan appropriately for communicating with people with disabilities during emergencies.<sup>195</sup> Highlighting the plan's deficiencies, the court detailed how the city's emergency plan failed to account for people with disabilities during a power failure:

237. The City's failure to account for people with disabilities during a power outage impairs their ability to meaningfully access the City's emergency services, such as sheltering, food and water distribution, and the provision of medical services]. Because many people with disabilities depend on elevators, a power outage renders many people with disabilities unable to leave their buildings. Those unable to leave their buildings are obviously unable to access the City's emergency services, such as sheltering, food and water distribution, and the provision of medical services.

238. The City's power outage plan does not account for this. It plans for the electric company, and if that fails, the Police De-

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191. Eric Klinenberg, *Dept. of Urban Planning: Adaptation: How Can Cities Be "Climate-Proofed"?*, THE NEW YORKER, Jan. 7, 2013, at 32, 32–33 [hereinafter *How Can Cities Be Climate-Proofed*], available at <http://archives.newyorker.com/?i=2013-01-07#folio=032>.

192. *E.g.*, Marans, *supra* note 61.

193. Marc Santora & Benjamin Weiser, *Court Says New York Neglected Disabled in Emergencies*, N. Y. TIMES, Nov. 7, 2013, [http://www.nytimes.com/2013/11/08/nyregion/new-yorks-emergency-plans-violate-disabilities-act-judge-says.html?partner=rss&emc=rss&\\_r=0&pagewanted=all](http://www.nytimes.com/2013/11/08/nyregion/new-yorks-emergency-plans-violate-disabilities-act-judge-says.html?partner=rss&emc=rss&_r=0&pagewanted=all).

194. *Brooklyn Ctr. for Independence of the Disabled v. Bloomberg*, No. 11 Civ. 6690, 2013 WL 5943995, at \*64–65 (S.D.N.Y. Nov. 7, 2013). Thanks to my student Andrew Jones in the Land Use and Community Lawyering seminar for bringing this decision to my attention when it was first handed down.

195. *Id.* at \*56, \*58.

partment, to check on people dependent on electricity-powered life-sustaining equipment in the event of a power outage. But the City's emergency plans do not require that, where possible, the public—or least those who depend on electricity for health, safety, or mobility—be notified in advance of a power outage; as explained above, the plans do not provide sufficient evacuation assistance to ensure that during a power outage, people with disabilities can exit their buildings; nor do they call for canvassing after an emergency, to help ensure that the services provided to people without disabilities may reach those with disabilities who are unable to leave their buildings.<sup>196</sup>

The court's closely detailed discussion reveals the interconnectedness and specificity of the needs of disabled people in emergency contexts. The decision highlights the degree to which city government and its agencies must address these considerations in their resilience planning to discharge sovereign obligations grounded in law and the imperatives of social equity.<sup>197</sup>

As Eric Klinenberg has persuasively demonstrated, disasters and emergencies draw attention to those who are vulnerable even in the context of day-to-day living as the result of an “impoverished social infrastructure.”<sup>198</sup> Thus, his analysis of vulnerability and resilience points to placing the requirements of the social infrastructure on an equal footing with the “hard infrastructure of power lines and transit systems and communications networks.”<sup>199</sup> To be sure, no city can act alone.<sup>200</sup> Ra-

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196. *Id.* at \*58. The court continued: “239. Although the City did undertake a large-scale canvassing effort after Hurricane Sandy, this canvassing was an improvised response to the realization that people remained trapped in their buildings after the storm. As noted, such “*ad hoc* reasonable accommodations . . . are both legally inadequate and practically unrealistic” in the context of an emergency preparedness program, the purpose of which “is to anticipate the needs of [the City’s] residents in the event of an emergency and to minimize” the need for improvisation, “particularly when the City’s infrastructure may be substantially compromised or strained by an imminent or ongoing emergency or disaster.” To ensure that people with disabilities are able to access the services provided by the City after an emergency, therefore, such a response must at least be incorporated into the City’s plans.” *Id.* at \*59 (quoting *Cmtys. Actively Living Indep. & Free v. City of Los Angeles*, No. CV 09–0287 CBM, 2011 WL 4595993, at \*14 (C.D. Cal. Feb. 10, 2011)).

197. *See generally id.* at \*1–66 (discussing whether City of Los Angeles officials failed to adequately plan for disabled individuals’ needs during an emergency or disaster).

198. Cassim Shepard, *Toward a Stronger Social Infrastructure: A Conversation with Eric Klinenberg*, URBAN OMNIBUS (Oct. 16, 2013), <http://urbanomnibus.net/2013/10/toward-a-stronger-social-infrastructure-a-conversation-with-eric-klinenberg/>.

199. *Id.*

200. *See generally How Can Cities be Climate-Proofed*, *supra* note 192, at 32–37 (discussing how those responsible for climate-proofing their respective cities share lessons learned from natural disasters with each other to develop new strategies for increasing their cities resilience).

ther, to be resilient, cities need to draw upon the resources of other levels of government as well as the private and non-profit sectors.<sup>201</sup> And as the experience of New York City has shown, it is also critical for cities to mobilize a community-based initiative: taking steps to reinforce the “social infrastructure” will be a key ingredient of any response,<sup>202</sup> one that city-level governments should be best situated to accomplish.

## VI. CONCLUSION

Drawing on the experience of New York City during and after Superstorm Sandy in 2012, this article has considered how a coastal city can pursue strategies of resilience in the context of climate change and weather disasters. It has argued that, to enhance its options for achieving resilience in relation to future storm surges and inundation, the city should consider a nuanced set of responses to ensure that it is addressing the social dimensions of disaster as keenly as the hard infrastructure measures that form the core of its resilience strategy. Relatedly, instead of a reflexive reliance on policies that commit to armoring and rebuilding the coastline, and further development of the waterfront, New York as a coastal city should consider how pursuing alternate strategies such as restoring wetlands and maintaining other local ecological systems in flood-prone areas can further the aims of resilience.

A promising first step is New York City’s support of a New York State-funded and -implemented buyout program for particularly vulnerable property owners that will replace residential structures with wetlands and other natural buffers. However, an overall shift in perspective is needed to promote a more nuanced, multifaceted way of thinking about resilience in the context of climate change that takes into account the social-ecological, psychological, and systems dimensions of resilience and recognizes how resilience in the era of climate change is crucially tied to a city’s social infrastructure. The district court’s close factual analysis of vulnerability in *Brooklyn Center for Independence of the Disabled v. Bloomberg* points to the kind of nuanced, fact-sensitive approach to understanding the needs of vulnerable populations, and the social context in which these needs can be met, that resilient cities must cultivate. As Eric Klinenberg has recognized, “the best techniques for safeguarding cities don’t just mitigate disaster damage; they also strengthen the networks that promote health and prosperity during ordinary times.”<sup>203</sup>

To adopt a resilient approach to extreme weather events, New York City cannot stop at armoring its waterfront, buildings, and infrastructure. Rather, it should draw on the sociological evidence discussed here, and build on some of the recommendations it outlined in its After Action

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201. *See generally id.*

202. *Id.* at 35.

203. *Id.* at 37.

Report,<sup>204</sup> a more searching but less trumpeted report assessing the shortcomings in the city's approach to community services in emergencies. Under such an approach, it should equally emphasize strengthening the social networks that extend the capacity of government to support vulnerable residents and that increase residents' own capacity to recover and function, resiliently. The imperatives of law and social equity require nothing less.

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204. See NYC HURRICANE SANDY AFTER ACTION REPORT, *supra* note 1, at 25–30.

